US Army Medical Research and Materiel

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Method and Compositions for Treating and Preventing Retinal Damage

Features and advantages:

- **Could be administered orally or topically (eye drops, ointments) before, during, and after trauma**
- **Could be given prophylactically to those at risk (firefighters, welders) of retinal damage**
- **Provides synergistic effects when nitrones and DHL or alpha-lipoic acids are combined**
- **Provides four possible means of protection: antioxidants; recyclers of antioxidant vitamins C and D; free radical energy stores (e.g., ATP)**

Patent Status

Patent No.: 6,939,102 **Available from:** www.uspto.gov
Date Issued: January 15, 2002 **Docket No.:** WRAIR 98-14

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KEYWORDS: Dihydrolipoic acid; alpha-lipoic acid; lipoates; nitrones; free radical scavengers; neuroprotectants; retinal injury; retinal disease

This invention provides methods for preventing or ameliorating retinal damage by administration of alpha-lipoic acid or dihydrolipoic (DHL) acid in appropriate pharmaceutical carriers.

The retina is a part of the central nervous system and thus contains neurons and glia, as well as photo receptors. Although the immediate mechanisms vary, many forms of neurotrauma are believed to share a common final pathway: the formation of neurotoxic free radicals. Individuals experiencing laser-induced retinal trauma frequently report seeing a bright flash of light at the time of the incident and subsequently notice impaired vision, often immediately. Retinal injuries may either improve, or worsen, over time. Clinically observed signs range from hemorrhage to whitening (burning) of the retina. In later stages, puckering and/or perforation of the retina may occur. In such cases, further deterioration occurs over time. It is likely that glutamate is released due to the trauma associated with laser beams. Nitrones have been shown to be neuro-protective against glutamate-induced toxicity in cultured neurons as well as in several rodent models of cerebral ischemia. Alpha-lipoic acid has been shown to be clinically safe in the treatment of diabetic neuropathy.

The invention could potentially protect the retina from damage associated with systemic or ocular disease conditions, including macular degeneration, glaucoma, temporal arteritis, and retinitis pigmentosa. The invention could also potentially limit damage associated with retinal exposures during space travel, military exercises, eye surgery, or exposure to head and neck irradiation.

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